Johnson Space Center

Demolition Waste Recycling: A Case Study

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Introduction

- From Design through construction: ***A Team effort***
- Pre-Project Planning
- Assessment
- Coordination / Implementation
- Case Study: B223 Closure / Demolition
- Other JSC demolition activities 2004/2005
- Wrap-up: Benefits, Costs, and Challenges

From Conceptual Design to Implementation: *A Team Effort*

- Planning and Integration Office
- Project Management Office
- Environmental Office
- Environmental Support Contractor
- A-E/Design Contractor
- Property Disposal Officer
- Contracting Officer
- Construction/Demolition Contractor
- PMO Construction Oversight Contractor
- Recycling Vendors

Pre-Project Planning

- Project Concept/Design Stage
  - The feasibility for waste recycling should be determined early in the project design phase
    - Includes a determination of complexity of separating materials
    - Sampling for hazardous constituents
    - Identifying and verifying contracting mechanisms to perform the recycling (NASA or construction contractor)

Assessment

- Determine potential recyclables
  - Concrete
  - Soil
  - Sand
  - Metals
  - Equipment
  - Refrigerants or Halons
- Evaluate if “worth” recycling based on effort and cost (somewhat subjective)

Assessment

- Identify materials which may be regulated when discarded, such as:
  - Items contaminated with asbestos
  - Items contaminated with lead paint
  - Mercury switches and thermostats
  - PCBs in transformers, ballasts, capacitors, heat transfer equipment
  - Contamination by hazardous materials
- Develop sampling plan and conduct sampling during design phase
- Include requirements in the specs and the contract

Coordination/Implementation

- Complete regulatory notifications and closure plan approval activities
- Coordinate with demolition/closure contractor
  - Schedule and timing
  - Collection containers number and placement
  - Responsibilities
  - Packaging or size requirements
- Coordinate transportation contractors
- Prepare shipping documentation for waste disposition

Overview of B223

- Originally B223 was the domestic sewage treatment facility for JSC
  - Converted to a chromate reduction treatment facility for cooling tower blowdown (chromium used as corrosion inhibitor up until 1990)
  - Facility had been sitting unused since early ’90s
- Demolition included closure under Texas Risk Reduction Program since it had been a regulated unit


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B223 Closure/Demolition

A coordinated closure/demolition plan between NASA and multiple contractors

- URS and DynCorp/Lynx, Ltd. performed extensive subsurface soil, drying bed sand and concrete treatment basin sampling and analysis for constituents of concern (zinc and chromium)
- DynCorp/Lynx, Ltd. performed decontamination and verification sampling of concrete and sand prior to demolition

B223 Closure/Demolition

- Laguna Construction performed the actual structural demolition.
- Lynx, Ltd. coordinated waste recycling activities with Laguna, Southern Crushed Concrete and the NASA Reuse and Reutilization Program.
- Recycled 99% of the waste materials: concrete, piping, sheet metal roof, drying bed sand, chemical storage tanks and some subsurface soil.

B223 Closure/Demolition

- Recycling cost savings: $39,000
- Cost of recycling: $50,000
- Significant landfill space savings realized
- 3,350,000 lbs. (89 loads) of concrete
- 350,000 lbs. of scrap metal

Other JSC Demolition Activities

- FY04 Photographic Waste Vault Demolition
  - 160,200 lbs concrete recycled
- FY04 Storage Warehouse Demolition
  - 1,005,744 lbs concrete recycled
- FY05 Photographic Waste Tank Closure
  - 31,860 lbs concrete recycled
- FY05 Boiler and Retention Pond Demolition
  - 1,443,960 lbs concrete recycled
  - 400,000 lbs steel recycled

Paving Tomorrow's Roads

Where did all the concrete go?

Southern Crushed Concrete Pasadena, TX

- Since 1992, the company has been recycling materials from industrial and non-industrial sources into top quality aggregate construction materials, creating a supply for the Texas Department of Transportation road and bridge projects.
- Their operations alone have conserved over 18 million tons of native rock and conserved over 13 million cubic yards of landfill space.

Recycling Costs

- Uncontaminated sand - $5.75/T
- Construction Debris (concrete/sand mixture) - $4.50/T
- Clean Concrete - no charge
- Cost for transportation of recyclables - $150.00/trip
- Cost for scrap metal transportation- $150.00/trip
- Cost for scrap metal recycling - no charge (revenues returned to JSC)

Challenges of Large Scale Recycling Projects

- Segregation of materials
- Finding a recycler
- Time and effort, especially for environmental contractor
- Cost to recycle
- Coordination and communications
- Environmental requirements
- Tracking

Questions?